

STUDIES ON THE SOUTH AFRICAN CLINIDAE. II. TWO NEW
SPECIES OF *CLINUS* FROM THE WESTERN CAPE

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(With 18 text-figures)

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INTRODUCTION

During 1963-4 a number of specimens of two clinids were obtained which, although they agree sufficiently in superficial appearance and fin counts with *Clinus acuminatus* (Bloch & Schneider) to have been identified provisionally as that species, have been found on closer examination to differ constantly in several characters from *Clinus acuminatus* and from each other. They are therefore described as new species. A redescription of *Clinus acuminatus* is included for comparative purposes.

DESCRIPTIONS

Clinus acuminatus (Bloch & Schneider, 1801)
(figs. 1, 4(a))

Blennius acuminatus Bloch & Schneider, 1801: 169.
Clinus acuminatus: Cuvier, 1817: 173; Cuvier & Valenciennes, 1836: 370; Swainson, 1839: 75; Gilchrist & Thompson, 1908: 124; Thompson, 1918: 146; Barnard, 1927: 859; Hubbs, 1952: 106.
Ophthalmolophus acuminatus: Smith, 1945: 542; Smith, 1949: 355.

Material: 1 specimen, 59 mm., Angra Pequena (Lüderitzbucht, South West Africa), S.A.M. 10544; 16 specimens, 24-90 mm., Lüderitzbucht, South West Africa, rock pools near top of shore, S.A.M. 24206; 38 specimens, 51-100



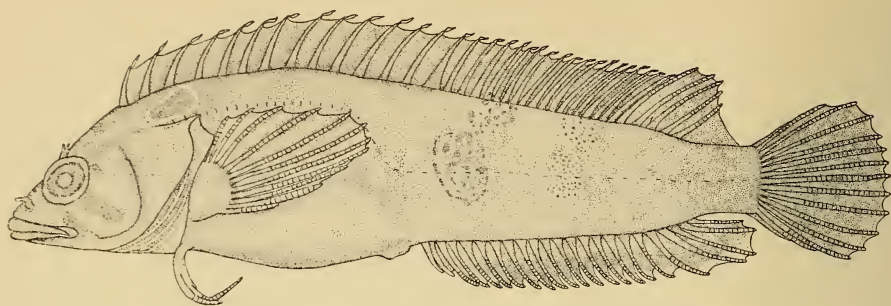


FIG. 1(a). *Clinus acuminatus* (Bloch & Schneider).

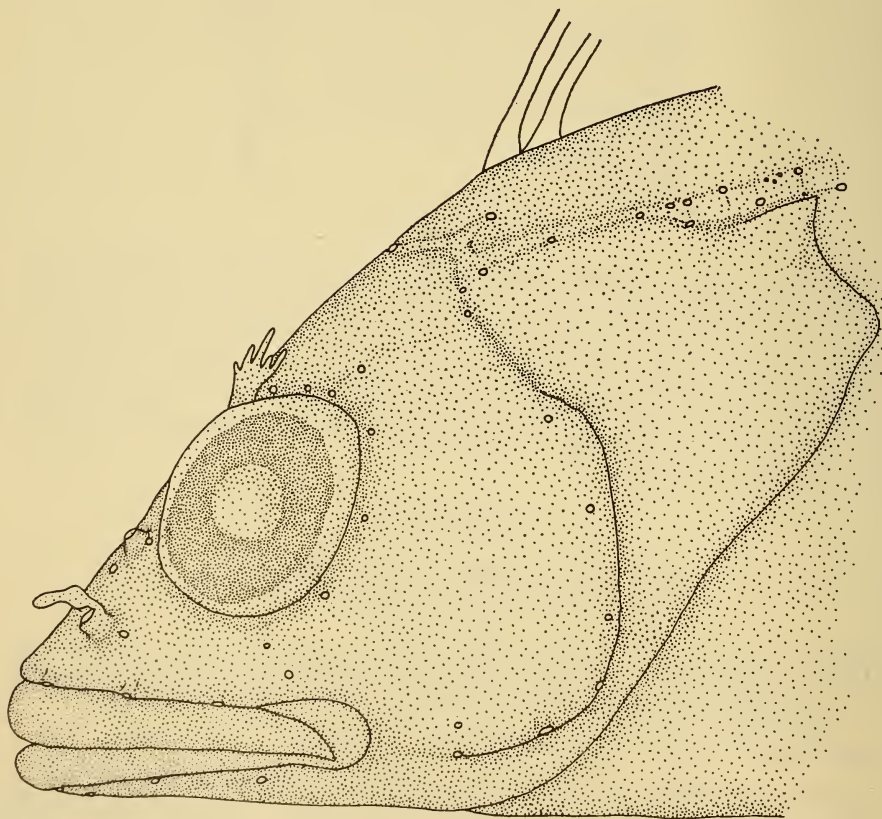


FIG. 1(b). Head pore system, *Clinus acuminatus*.

mm., Port Nolloth, rock pools near top of shore, S.A.M. 24220; 12 specimens, 65–113 mm., Lambert's Bay, rock pools near top of shore, S.A.M. 23922; 2 specimens, 37 & 38 mm., Langebaan, Saldanha Bay, rock pool near top of shore, S.A.M. 23925; 7 specimens, 41–73.5 mm., Sea Point, rock pool near top of shore, S.A.M. 22840; 3 specimens, 66–88 mm., Kommetjie, S.A.M. 10541; 3 specimens, 47–55 mm., Froggy Pond, False Bay, rock pool near top of shore, S.A.M. 23924; 1 specimen, 97 mm., St. James, False Bay, S.A.M. 12023; 27 specimens, 43.3–103 mm., St. James, False Bay, rock pools near top of shore; 21 specimens, 35–86 mm., False Bay, S.A.M. 10542; 4 specimens, 73–88 mm., Hermanus, rock pool near top of shore.

Description

Fin counts: D. XXXI–XXXIV (XXXII–XXXIII) 5–7; A. II 20–24 (21–22); P. 12–13 (12); V. I 2–3; C. 13.

Dorsal fin low, even, first spine shortest, 14.5–25% of head length. Clusters of 2–3 cirri at tips of dorsal spines for about half length of fin. No notch in membrane between third and fourth dorsal spines. Pectoral fin rounded, of twelve rays, exceptionally thirteen. Inner pelvic ray greatly reduced or absent. Caudal peduncle short, 20.5–33.5% of head length, depth of caudal peduncle 20–35% of head length. Caudal fin subtruncate.

Body covered with small scales extending on to dorsal fin base, anal and caudal fin bases and head naked. Depth at anal origin 4.5–5.75 in standard length. Head 3.2–4.25 in standard length. Interorbital flat, 12.5–20.8% of head length. Snout wedge-shaped, angle of profile acute. Eye 2.75–5 in head. Supra-orbital tentacle with a short, flattened stalk, terminating in a number of short, simple branches. Cirrus on anterior nostril short, flattened, trilobed. Upper jaw 34.5–50% of head length, mouth increasing with size of fish. Vomer toothed. Lips moderate to fairly thin.

Pores on head few, large (fig. 1(b)), mostly simple, opening flush with skin.

Lateral line of 2–4 double pores in front above operculum, then of mainly alternating single pores above and below line to post-pectoral curve; after that of short separate horizontal tubes with a pore at either end. Intromittent organ of male large and spade-shaped, with a moderately long, thick basal portion, a small pair of dorsal lips, and a large pair of broad ventral lips ensheathing the tip (fig. 4(a)).

Colouring: Green with brown and cream cross-bars, or green with black speckling forming large sparse spots with a mosaic-like pattern. Tips of all fins and supra-orbital tentacles orange red. Belly whitish. Two dark radiating bands across cheek.

Distribution

Lüderitzbucht (South West Africa) to Cape Agulhas, under stones in shallow pools near the top of the shore.

Clinus obtusifrons n.sp.

(fig. 2, 4(b))

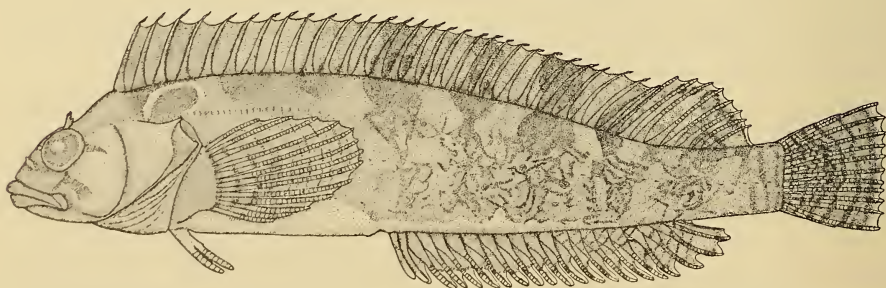
Material: 2 specimens, 24 and 36 mm., Lüderitzbucht, South West Africa, rock pools from mid-tidal level down, S.A.M. 24211; 11 specimens, 56–93 mm., Port Nolloth, rock pools from mid-tidal level down, S.A.M. 24216; 1 specimen, 20 mm., 26 miles north of Swakopmund, South West Africa, rock pool at mid-tidal level, S.A.M. 24201; 5 specimens, 56–80 mm., Sea Point, rock pool at mid-tidal level, S.A.M. 23923; 3 specimens, 56–80 mm., Gert du Toit Bay, southern Namaqualand, S.A.M. 24253; 12 specimens, 32–76 mm., Lambert's Bay, S.A.M. 24254; 3 specimens, 66–115 mm., Hondeklip Bay, rock pools from mid-tidal level down, S.A.M. 24670 (paratypes); 1 specimen, 116 mm., Hondeklip Bay, rock pool at mid-tidal level, S.A.M. 24671 (holotype).

Description

Fin counts: D. XXX–XXXII (XXX–XXXI) 6–7; A. II 20–22 (20–21); P. 13; V. I 2–3; C. 13.

First three dorsal spines not forming a crest, but equal to or longer than fourth and succeeding spines, second spine longest. First spine 27–34% of head length. No notch in membrane between third and fourth dorsal spines. Dorsal spines each with a single cirrus at tip. Pectoral fin rounded, invariably of thirteen rays. Inner pelvic ray minute or absent. Caudal peduncle short, 20–35% of head length, depth of caudal peduncle 20–35% of head length.

Body covered with small scales, extending on to dorsal and caudal fin bases but not on to anal fin base or head. Depth at anal origin 4–5. Head heavy, 3.2–4.25 in standard length. Snout bluntly rounded, angle of profile obtuse. Interorbital flat in small specimens, concave in larger specimens (over 100 mm.), with marked bony ridges over the eye, 16.7–27.3% of head length. Eye 3–4.5 in head. Supra-orbital tentacle with a flattened stalk terminating in several short, simple branches. Some mucus pores on head opening on small papillae. Nasal cirrus flattened, expanded, and roughly triangular at tip. Upper jaw 36.4–50%

FIG. 2(a). *Clinus obtusifrons* n.sp.

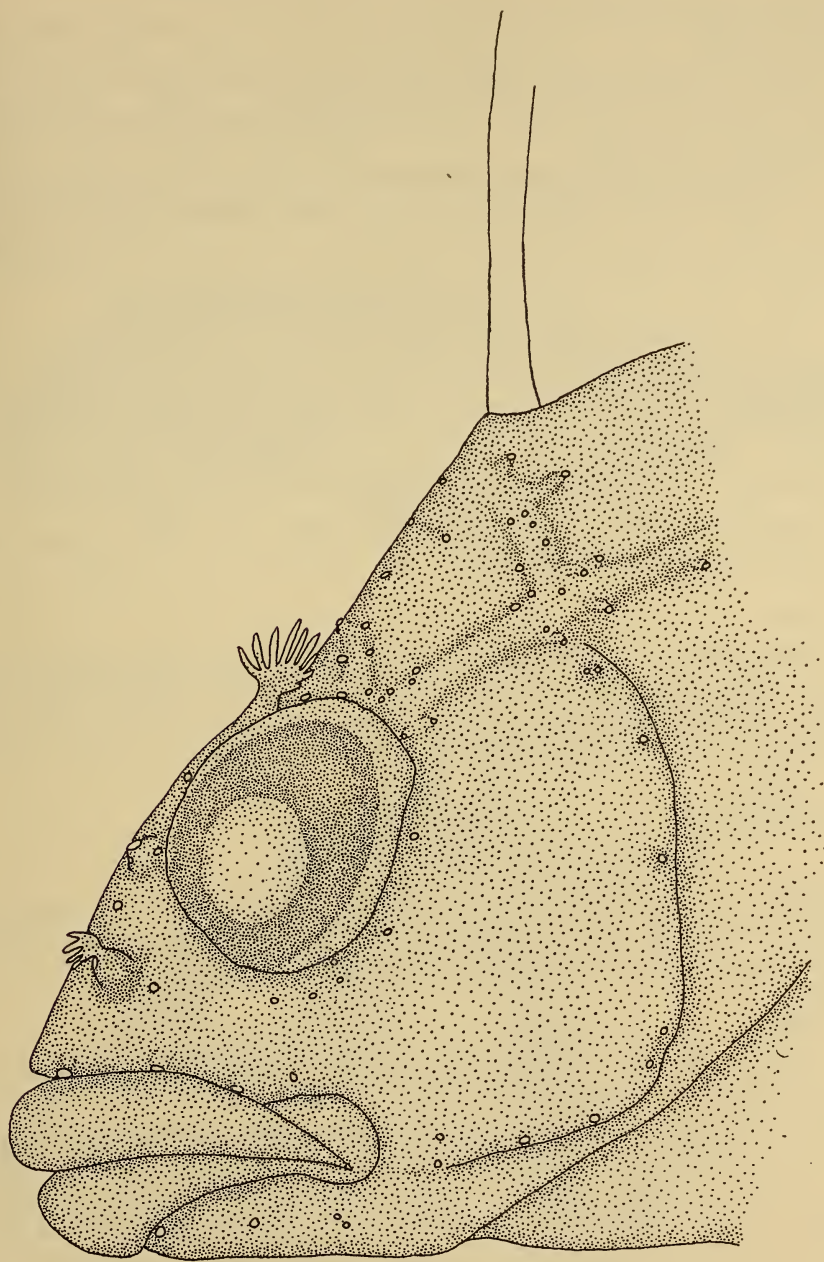


FIG. 2(b). Head pore system, *Clinus obtusifrons*.

of head length, mouth increasing with size of fish. Vomer toothed. Lips moderate to thick.

Pores of head few, most single; several of postocular region double. Most opening flush with skin surface. Some, especially postocular region, opening on papillae (fig. 2(b)).

Lateral line of single pores opening above and below line, interspersed with a few double pores, to post-pectoral curve, then of short separate horizontal tubes with a pore at either end. Intromittent organ of male with a long basal portion and a slender, upwardly hooked tip. A pair of small, rounded lateral lips (fig. 4(b)) and a pair of smaller rounded dorsal lips.

Colouring: Dusky or slaty with darker cross-bars, speckled or mottled with blue or white when fresh. Tips of anal and pelvic rays red. A prominent bluish ocellate spot on shoulder. Two dark radiating bars across cheek. Tips of dorsal fin and supra-orbital tentacles white.

Distribution

Swakopmund (South West Africa) to False Bay, under stones in pools from mid-tidal level to bottom of shore.

Remarks

This species can be distinguished from *Clinus acuminatus* by the shape of the snout, the number of pectoral rays, the form of the intromittent organ, the height of the first dorsal spine, the width of the interorbital and its shape in large specimens. It also occupies a different habitat on the shore.

Clinus berrisfordi n.sp.

(fig. 3, 4(c))

Material: 15 specimens, 37.5–96 mm., Onrust River mouth, rock pool near bottom of shore, S.A.M. 24221 (paratypes); 1 specimen, 106 mm., Onrust River mouth, rock pool near bottom of shore, S.A.M. 24601 (holotype).

Description

Fin counts: D. XXXIII–XXXVI (XXXIV–XXXV) 5–6; A. II 23–25 (23–24); P. 11–12 (12); V. I 3; C. 13.

First three dorsal spines not elevated to form a crest, but equal to or longer than fourth and succeeding spines, first spine 25–33.3% of head length. No notch in membrane between third and fourth dorsal spines. Dorsal spines with clusters of 3 fine cirri at tips for about half length of fin. Pectoral fin rounded, of twelve, exceptionally eleven, rays. Inner pelvic ray minute but developed in all specimens examined. Caudal peduncle short, length 20–35% of head length. Caudal fin subtruncate.

Body covered with small scales extending on to dorsal and caudal fin bases; anal fin base and head naked. Depth at anal origin 4.5–5.1 in standard length.

Interorbital flat, 12.5–16.7% of head length. Snout wedge-shaped, angle of profile acute. Eye 3.4–2 in head. Supra-orbital tentacle with a flattened stalk terminating in numerous long, slender filaments. Cirrus on anterior nostril with a narrow stalk and a flattened, bilobed tip. Upper jaw 36.4–50% of head length. Vomer toothed. Lips moderate to thin.

Pores of head more numerous than in preceding species, most double, on more or less raised papillae, sensory canals clearly visible, raised (fig. 3(b)).

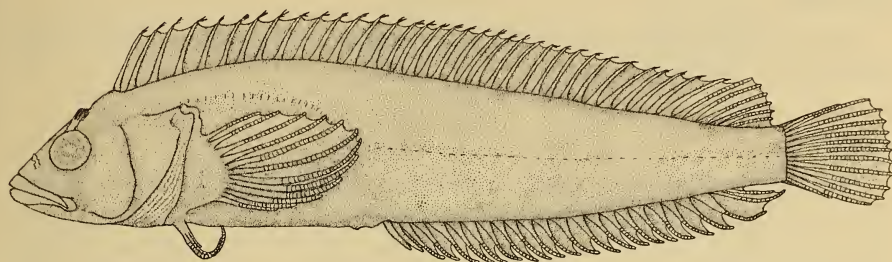


FIG. 3(a). *Clinus berrisfordi* n.sp.

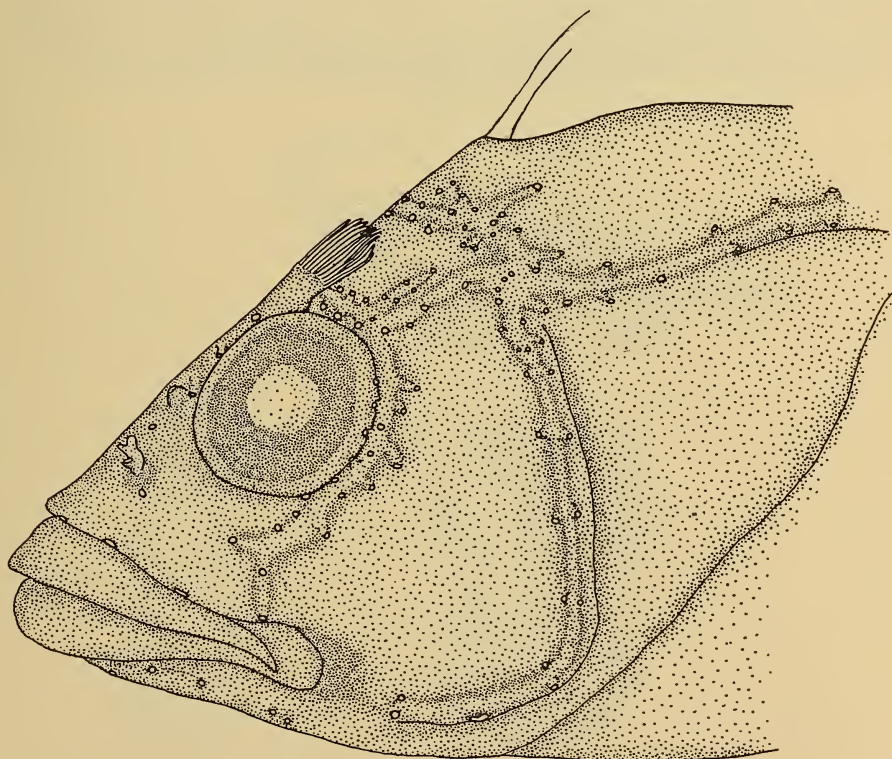


FIG. 3(b). Head pore system, *Clinus berrisfordi*.

Lateral line usually of about 27 double pores in front to post-pectoral curve, then of short, separate horizontal tubes with a pore at each end. Intromittent organ of male with a long basal portion and a slender, upturned tip; a pair of bilobed ventro-lateral lips and a small pair of rounded dorsal lips (fig. 4(c)).

Colouring: Reddish orange with faint darker cross-bars. Two dark radiating lines from eye across cheek.

Distribution

So far recorded from the single type locality, Onrust River mouth, near Hermanus.

Remarks

This species differs from *Clinus acuminatus* in the dorsal and anal ray counts, the form of the male intromittent organ, the height of the first dorsal spine, the form of the supra-orbital tentacle, the anterior part of the lateral line and the head pores and the habitat. It differs from *Clinus obtusifrons* in the dorsal, anal, and pectoral fin counts, the shape of the snout, the form of the supra-orbital tentacle, the form of the intromittent organ, the anterior part of the lateral line, the head pores, the width of the interorbital, the shape of the interorbital in large specimens, and the clusters of cirri at the tips of the dorsal spines.

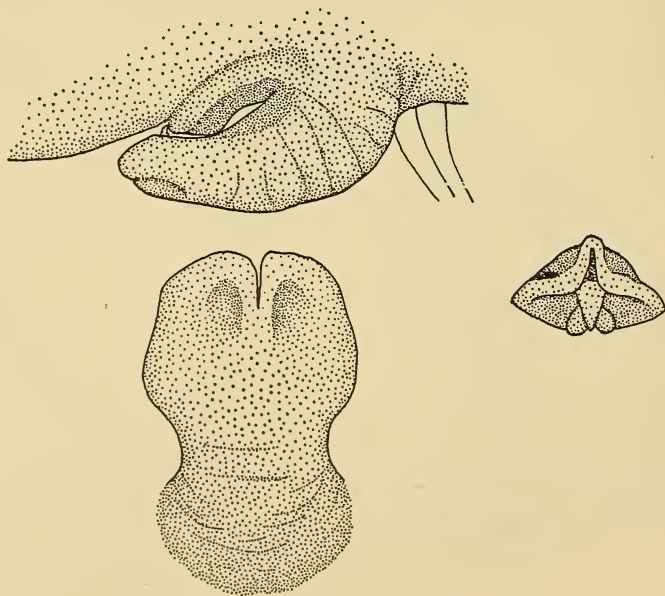


FIG. 4. Intromittent organs of (a) *Clinus acuminatus*.

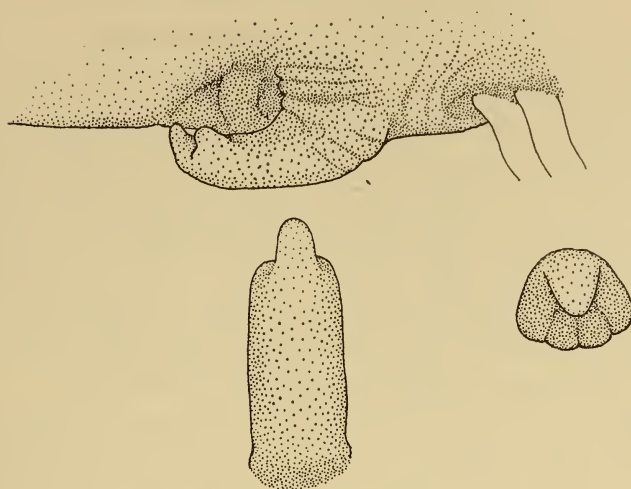


FIG. 4(b). *Clinus obtusifrons*.

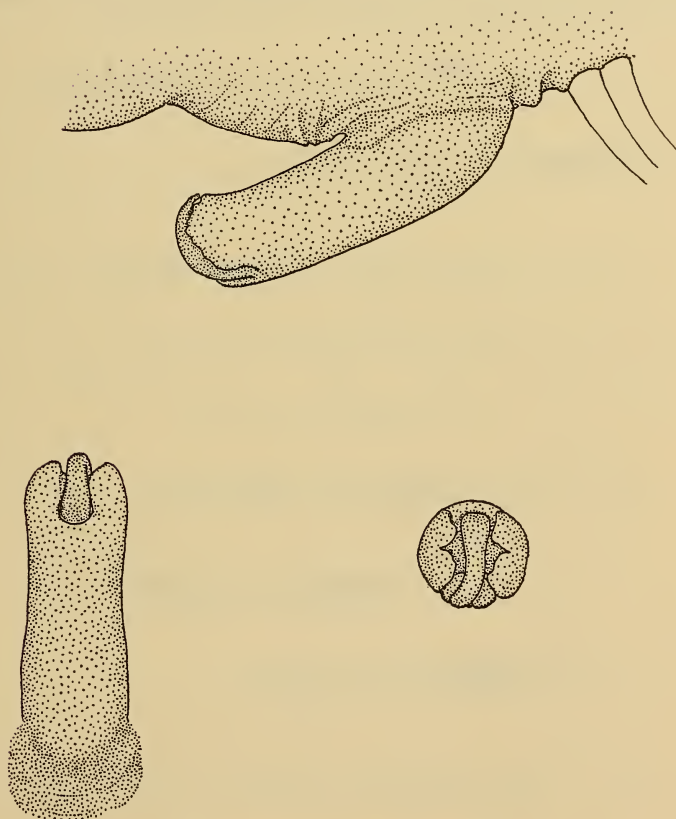


FIG. 4(c). *Clinus berrisfordi*.

FIN RAY COUNTS AND BODY PROPORTIONS

During the examination of the three species described above it was found that for certain characters, such as some of the fin ray counts and body proportions, although the ranges for the different species overlapped considerably or were identical, the means differed widely. It was decided that this could best be demonstrated by a statistical method used by Hubbs (1952) to show statistical differences between populations of American clinids. The method demonstrates graphically the range, mean, and one standard deviation and two standard errors on either side of the mean. Thus, in fig. 5, the base line represents the range, the upright line the mean, and the shaded areas the limits of two standard errors on either side of the mean. The unshaded areas represent the limits of one standard deviation on either side of the mean.

The samples were not divided into different size groups, as allometric growth in the South African Clinidae has been found to be similar and slight for most species. Measurements showing a very wide range, such as orbit diameter and upper jaw length, can be considered to exhibit allometric growth, but those characters show no clear differences between these and many other related species, so are not considered important at the specific level.

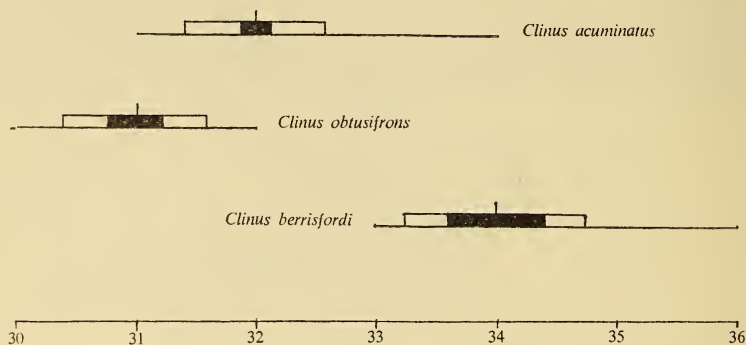


FIG. 5. Number of dorsal spines.

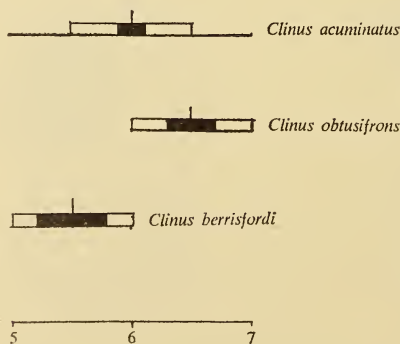
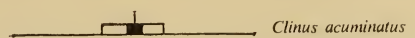


FIG. 6. Number of dorsal soft rays.



Clinus obtusifrons

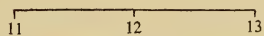
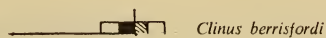


FIG. 7. Number of pectoral rays.

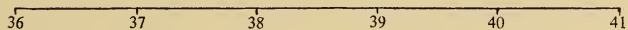
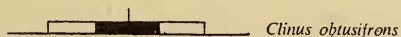


FIG. 8. Total number of dorsal elements.

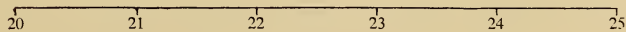
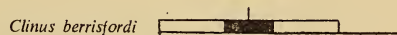
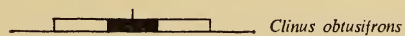
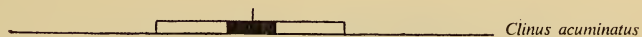


FIG. 9. Number of anal rays.

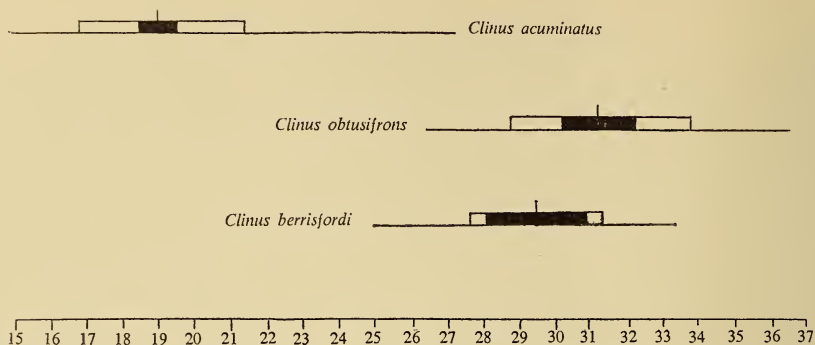


FIG. 10. Height of first dorsal spine as percentage of head length.

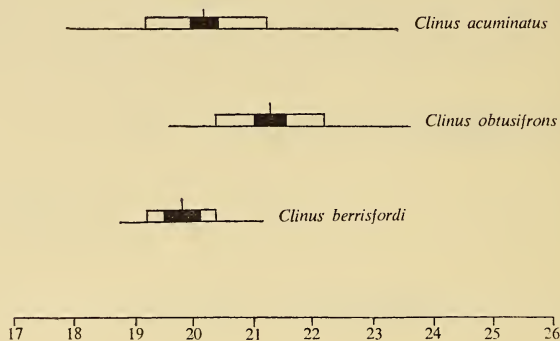


FIG. 11. Depth at dorsal origin as percentage of standard length.

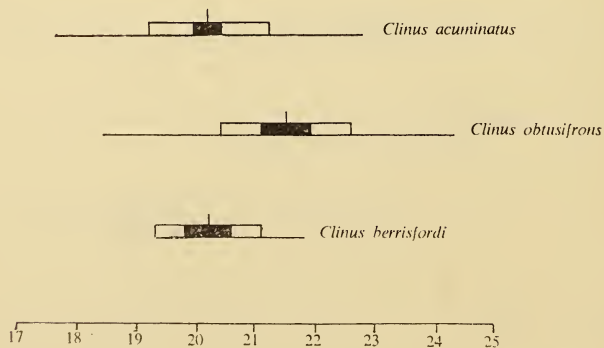


FIG. 12. Depth at anal origin as percentage of standard length.

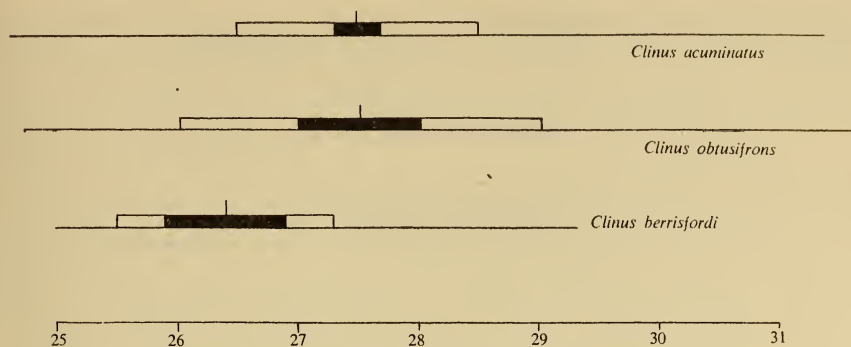


FIG. 13. Head length as percentage of standard length.

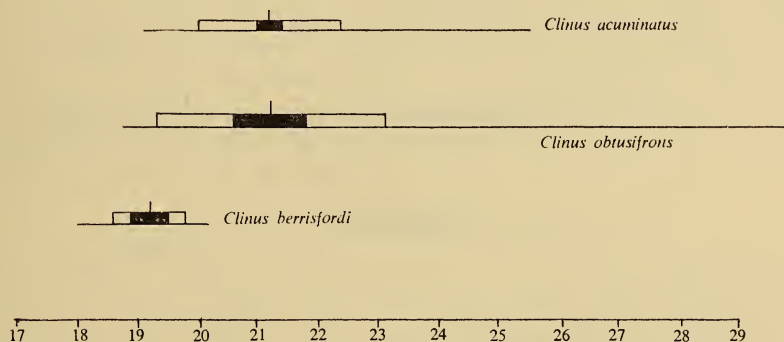


FIG. 14. Dorsal origin to snout as percentage of standard length.

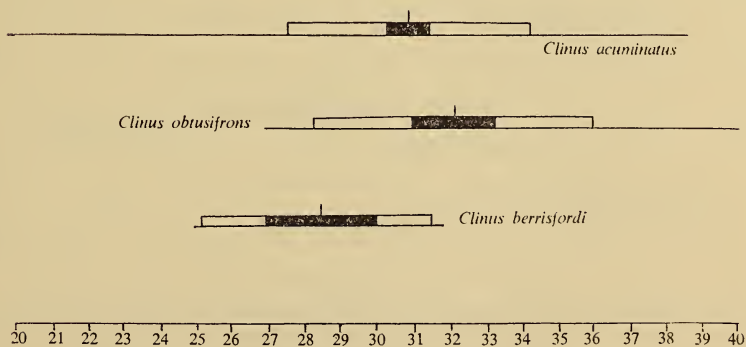


FIG. 15. Snout length as percentage of head length.

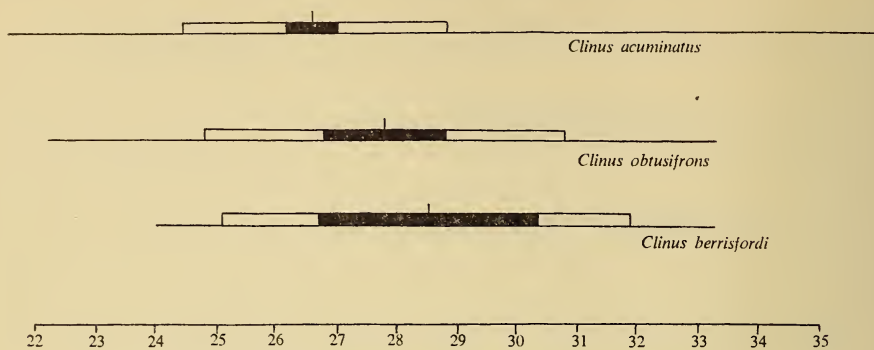


FIG. 16. Orbit diameter as percentage of head length.

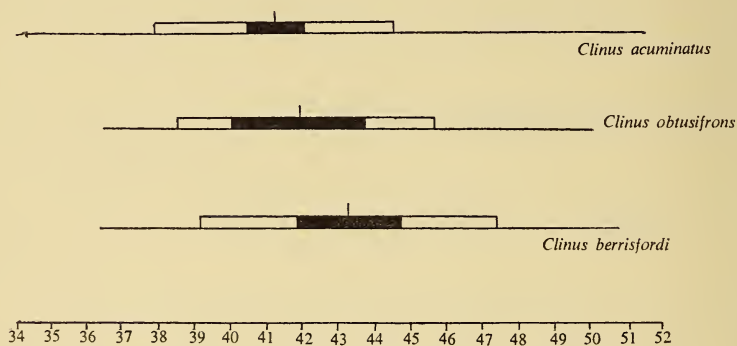


FIG. 17. Upper jaw length as percentage of head length.

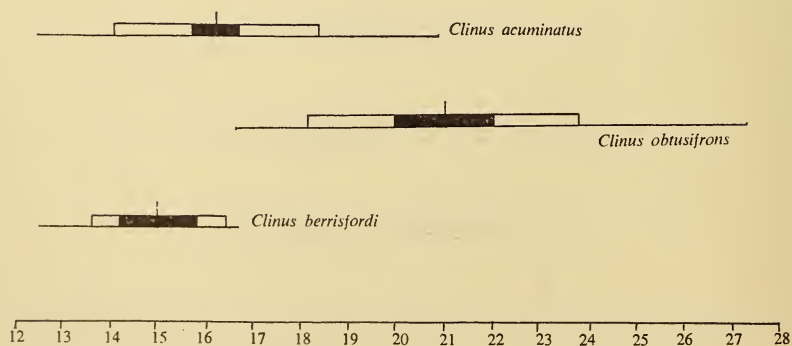


FIG. 18. Interorbital width as percentage of head length.

The results are shown in figs. 5-18. The formulae used for determining the standard error and standard deviation were those given by G. M. Smith (1958). The differences are considered to be significant if there is no overlap between the limits of two standard errors on either side of the mean for two different species.

Fig. 5 shows that *Clinus berrisfordi* has a considerably higher dorsal spine count than the other two species, and also that *Clinus obtusifrons* has a statistically lower count than *Clinus acuminatus*, although owing to the overlap of the normal ranges the dorsal spine count cannot be used as a distinguishing character for these two species. Conversely, *Clinus obtusifrons* has a statistically higher number of dorsal soft rays than the other two species (fig. 6). However, the range of the dorsal soft ray count is so small for all three species that the dorsal total shows little difference from the dorsal spine count (fig. 8). *Clinus obtusifrons* has statistically the lowest anal ray count (fig. 9). It would be expected that an increased number of median fin elements would be associated with elongation of the body, and in this connection it is interesting to note that *Clinus obtusifrons*, with the lowest number of median fin elements, is statistically deeper-bodied, i.e. less elongate, than the other two species (figs. 11, 12). The marked shortness of the first dorsal spine of *Clinus acuminatus* is demonstrated in fig. 10. Figs. 13-15 show *Clinus berrisfordi* to have a statistically shorter head and snout than the other two species. The interorbital is shown to be significantly wider in *Clinus obtusifrons* than in *C. acuminatus* and *C. berrisfordi* (fig. 18).

DISCUSSION

It is evident both from the differences in measurable characters and from differences such as the form of the intromittent organ, supraorbital tentacle, lateral line, cirral clusters on spines, and snout shape that the three clinids discussed cannot be placed together in a single species. The three clinids are therefore treated as separate species. In many groups it might be felt that the differences indicate subspecific rather than specific separation, but among the South African Clinidae there are so many pairs or groups of species that closely resemble one another and can be separated only on minor characters, that to introduce subspecies into the group would necessitate the use of a complex trinomial classification, and this is considered undesirable where the different species are clearly distinguishable, although closely related. The three species in question are sufficiently distinct from one another to render confusion unlikely if specimens are properly examined, and for this reason it is considered justifiable to treat them as separate species. The ecological separation of the species is not decisive, since there is considerable overlap in the ecological ranges of most of them. Although *Clinus acuminatus* has its maximum occurrence in pools at the top of the shore while the other two species are found at mid-tidal level or below, at Port Nolloth a single specimen of *Clinus acuminatus* was collected in a mid-tidal pool together with several specimens of *Clinus obtusifrons*, and presumably this occurs not infrequently, yet the two populations have remained distinct.

SUMMARY

Two new species of fish of the genus *Clinus*, *C. obtusifrons* and *C. berrisfordi*, are described and figured, and compared with *C. acuminatus* (Bloch & Schneider). Differences in the fin ray counts and body proportions of the species are shown by means of statistical diagrams.

ACKNOWLEDGEMENTS

I am indebted to Professor J. L. B. Smith of the Department of Ichthyology, Rhodes University, Grahamstown, for helpful discussions, and to Mr. C. D. Berrisford and my husband, Mr. M. J. Penrith, for collecting the specimens.

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TABLE 1. Data on which figs. 5-18 are based

Characters		<i>Clinus acuminatus</i>	<i>Clinus obtusifrons</i>	<i>Clinus berrisfordi</i>
Dorsal spines	Range	31-34	30-32	33-36
	Mean	32	31	34
	Standard deviation	0.60	0.60	0.74
	Standard error	0.05	0.10	0.20
Dorsal soft rays	Range	5-7	6-7	5-6
	Mean	6	6.5	5.5
	Standard deviation	0.50	0.50	0.50
	Standard error	0.05	0.09	0.15

TABLE 1. (continued)

Characters		<i>Clinus acuminatus</i>	<i>Clinus obtusifrons</i>	<i>Clinus berrisfordi</i>
Pectoral rays	Range	11-13	13	11-12
	Mean	12	13	12
	Standard deviation	0.25	0.00	0.25
	Standard error	0.025	0.00	0.05
Dorsal total	Range	37-40	36-38	39-41
	Mean	38	37	39.5
	Standard deviation	0.60	0.66	0.22
	Standard error	0.05	0.12	0.06
Anal rays	Range	20-24	20-22	23-25
	Mean	22	21	23.75
	Standard deviation	0.80	0.65	0.75
	Standard error	0.10	0.10	0.10
Height of first dorsal spine % of head length	Range	14.6-27.2	26.5-36.4	25.0-33.3
	Mean	19.0	31.3	29.5
	Standard deviation	2.40	2.70	2.80
	Standard error	0.20	0.50	0.70
Depth of body at dorsal origin as % of standard length	Range	17.9-23.4	19.6-23.6	18.8-21.2
	Mean	20.2	21.3	19.8
	Standard deviation	1.00	0.90	0.60
	Standard error	0.10	0.15	0.15
Depth of body at anal origin as % of standard length	Range	17.7-22.8	18.5-24.3	19.7-21.8
	Mean	20.2	21.5	20.2
	Standard deviation	1.00	1.50	0.90
	Standard error	0.09	0.20	0.20
Head length as % of standard length	Range	24.6-31.4	24.7-31.6	25.0-29.3
	Mean	27.5	27.5	26.4
	Standard deviation	1.00	1.50	0.90
	Standard error	0.10	0.25	0.25
Dorsal origin to snout as % of stan- dard length	Range	19.1-25.5	18.8-29.8	18.0-20.2
	Mean	21.2	21.2	19.2
	Standard deviation	1.20	1.90	0.60
	Standard error	0.10	0.30	0.15
Snout length as % of head length	Range	20.0-38.5	26.8-40.0	25.0-31.8
	Mean	30.8	32.2	28.5
	Standard deviation	3.00	3.50	2.70
	Standard error	0.25	0.60	0.80
Orbit diameter as % of head length	Range	21.6-36.3	22.2-33.3	24.0-33.3
	Mean	26.7	27.8	28.5
	Standard deviation	2.20	3.00	3.40
	Standard error	0.02	0.50	0.90
Upper jaw as % of head length	Range	34.3-51.5	36.4-50.0	36.4-50.0
	Mean	41.2	41.9	43.3
	Standard deviation	3.30	3.70	4.10
	Standard error	0.30	0.95	0.70
Interorbital width as % of head length	Range	12.5-20.8	16.7-27.3	12.5-16.7
	Mean	16.2	21.0	15.0
	Standard deviation	2.10	2.80	1.10
	Standard error	0.20	0.50	0.32